hemisphere in the opposite direction. It must therefore be of supreme importance.

Every serious student of meteorology should obtain Part iv. of the manual and read it, and all will hope that the other parts may be published shortly.

W. H. DINES.

RESEARCHES ON FLUORESCENCE.

Researches in Physical Optics. Part ii. *Resonance Radiation and Resonance Spectra.* By Prof. R. W. Wood. (Publication No. 8 of the Ernest Kempton Adams Fund for Physical Research.) Pp. viii + 184 + x plates. (New York: Columbia University Press, 1919.)

THIS is the second instalment of a valuable re-publication of Prof. Wood's papers. The first half of the volume deals with the spectroscopic properties of iodine vapour, particularly the study of the fluorescent spectrum with high resolving power. The difficulty with this, as with most other modern optical experimenting, is lack of light, and the success attained in overcoming the obstacle by well-thought-out optical arrangements is very remarkable; but the complexity of the phenomena brought to light is such as may well make theoretical progress seem almost hopeless.

It has been possible to obtain monochromatic stimulation at one particular absorption line of the iodine spectrum by the ingenious but simple device of using the mercury vacuum arc as illuminant. If the arc is run at low-current density, one line only of the iodine spectrum is covered by the green mercury line. Even in this case the result is to stimulate not merely the line primarily excited, but also a series of doublet lines, extending along the spectrum on either side of the latter. Stokes's law of fluorescence is thus completely violated.

All this results from the stimulation of one line only of the iodine spectrum.

But this line is one of forty thousand, and it appears that we can scarcely rely on it as being typical, since the iodine lines are of many varieties, as shown by their minute structure and by the Zeeman effect and the magnetic rotatory properties.

No doubt what is wanted for this class of research is some means of obtaining intense monochromatic stimulation of great purity, and with its frequency under control over a wide range. Prof. Wood is able to do something in this direction by altering the current through the mercury arc, and thereby the width of the green mercury line; this makes it overlap several of the iodine lines, and the complexity of the phenomena is thus greatly increased. It is perhaps worthy of consideration whether the Doppler effect obtained by moving the source could be of service, but this method would probably be very difficult of execution, and the range that could be hoped for very far short of what is desired.

The second half of the volume deals with other phenomena of fluorescence in gases of a miscellaneous kind, but is marked throughout by the same fertility of resource in devising experimental methods. The re-emission of the mercury radiation at wave-length 2536 when cold mercury vapour is stimulated by this radiation is an observation of special importance; the question presses for answer how this resonance is related by the scattering of white light by gases when there is no resonance.

R.

SCIENTIFIC STUDY OF THE SUGAR GROUP.

The Simple Carbohydrates and the Glucosides. By Dr. E. Frankland Armstrong. Third edition. (Monographs on Biochemistry.) Pp. x + 239. (London: Longmans, Green, and Co., 1919.) Price 12*s.* net.

THE third edition of Dr. E. F. Armstrong's monograph is something more than a new and revised issue; it is, to all intents and purposes, a new book. Such a statement may not, on first inspection, seem to be well founded, as the general scheme adopted by the author in the earlier editions has been retained, and the subdivision of the material into chapters remains much as before. A comparative reading of the texts, however, shows that some of the changes introduced are fundamental, and a reader making his first acquaintance with the specialised chemistry of the carbohydrates through a study of the latest edition will thus acquire not only much new information, but also an entirely new perspective.

The seven years which have elapsed since the appearance of the second edition have been marked by considerable activity in sugar research, and the fact that Emil Fischer closed his career by once more directing the work of his school to this subject would almost in itself be sufficient to make a fresh edition necessary. Many novel and unexpected types of compounds have been isolated, and these are now fully described and classified under an improved nomenclature; but this alone does not explain the advances made in the present book.

Dr. Armstrong has been quick to realise that the recent recognition of the specially reactive forms of sugars which are regarded as ethylene-oxides has opened out many new fields of inquiry, and has made clear much that has hitherto been

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obscure. He has therefore introduced the new structural ideas at an early stage of his narrative, and keeps them continually before the reader, adding on the way many fresh suggestions and criticisms. His treatment of this difficult subject is extremely lucid, and the result is strikingly successful.

Although the book has been considerably expanded by the inclusion of much new experimental material, little need be said regarding the details of the subject-matter, as nothing of present or potential importance has been overlooked, and the enlargement of the various chapters is well balanced. The high standard of accuracy maintained throughout the text extends to the comprehensive bibliography, which is carefully classified according to the topics discussed—a plan which saves time when a rapid search through the original literature is necessary.

Monographs suitable for both the research worker and the advanced student play a part of ever-increasing importance in our scientific education, and the present book is a model of its kind. Considering the magnitude and the wide appeal of carbohydrate chemistry, it is no easy task to compress within narrow limits an accurate account of the most important features of the sugars, and at the same time to avoid the dangers of merely cataloguing compounds or of losing all style in telegraphic brevity. Dr. Armstrong has skilfully avoided these dangers, and has succeeded in making his narrative interesting without sacrificing any essentials, and that this has been possible is ample testimony to the excellence of the scheme upon which the original edition was planned. The leanings of the author, as a practical worker in this field, to the biological aspects of sugar chemistry are well known, but Dr. Armstrong is a firm believer in the value of structural study, and he therefore establishes constitutional principles before proceeding to descriptive details.

It is, then, on the elastic framework of structural chemistry that Dr. Armstrong has arranged the complex facts of sugar chemistry, and he has done so systematically, thoroughly, and with scholarly judgment. No point of view is neglected. The organic chemist is not allowed to forget that Nature is the great sugar laboratory, and that he must work in association with the biologist. On the other hand, the biochemist is forced to think in the exact terms of structure, and the lesson is probably necessary.

For several years the reviewer has been in a position to appreciate the merits of the earlier editions by observing the use made of them by graduates commencing research work on the sugars. The monograph has answered most successfully to this practical test, and as the latest edition is a distinct advance on its predecessors, students of the sugar group will have access to a thoroughly satisfactory book—a book written with the authority of the expert and conveying the stimulus of the enthusiast.

NUTRITION AND LONGEVITY.

(1) *The Newer Knowledge of Nutrition: The Use of Food for the Preservation of Vitality and Health.* By E. V. McCollum. Pp. ix+199. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1919.) Price 6*s*. 6*d*. net.

(2) *On Longevity and Means for the Prolongation of Life: Founded on a Lecture delivered before the Royal College of Physicians on December* 3, 1903. By Sir Hermann Weber. Edited by Dr. F. Parkes Weber. With a preface by Sir Clifford Allbutt. Fifth (enlarged) edition, revised and partly re-written. Pp. xxii+292. (London: Macmillan and Co., Ltd., 1919.) Price 12*s*. net.

(1) PROF. E. V. McCOLLUM sets forth in volume form the results of, and conclusions to be drawn from, his well-known researches on food accessory bodies, the discovery of which was initiated by Dr. Gowland Hopkins. These bodies, called "vitamines" by Funk, are now realised to be of the greatest importance to growth, health, and resistance to disease, the lack of them making the body susceptible to the rank growth of microbes.

Prof. McCollum inclines to doubt that scurvy is due to the lack of a water-soluble accessory body A, strong evidence for the existence of which has been adduced by the workers at the Lister Institute, Dr. Harden, Miss Chick, and others. He lays the greatest stress on the fat-soluble A accessory body, which is of supreme importance for growth, and is to be found in growing cells and in milk, eggs, and the germ of seeds (wheatberry, etc.), substances specially formed with growth principles in them. The miller removes the germ in the preparation of white flour, and, classed as offal, it goes to feed and promote the growth of pigs and chickens.

Dairy produce from cows fed on green leaves and the green leaf itself supply "fat-soluble A," and are thus the great protective foods, and every endeavour must be made to keep up the supply of these. Green vegetables must not be regarded

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